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Research Article

A contribution to the *Atherigona* (Diptera, Muscidae) fauna of Angola

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Abstract

This study lists a total of 13 species of *Atherigona* Rondani, 1856 from Angola, 9 of which were previously recorded: *Atherigona* (*Atherigona*) *bedfordi* van Emden, 1940; *Atherigona* (*Atherigona*) *campestris* Deeming, 1971; *Atherigona* (*Acritochaeta*) *cogani* Deeming, 1981; *Atherigona* (*Atherigona*) *laevigata* (Loew, 1852); *Atherigona* (*Atherigona*) *lineata* ssp. *lineata* (Adams, 1905); *Atherigona* (*Atherigona*) *lineata* ssp. *ugandae* van Emden, 1940; *Atherigona* (*Atherigona*) *matilei* Deeming, 1977; *Atherigona* (*Atherigona*) *mirabilis* ssp. *mirabilis* Deeming, 1971; *Atherigona* (*Acritochaeta*) *orientalis* Schiner, 1868; and *Atherigona* (*Atherigona*) *ruficornis* Stein, 1913. One previously described species, *Atherigona* (*Atherigona*) *albistyla* Deeming, 1971, has now been added as a new record. Three species are newly described: *Atherigona* (*Atherigona*) *adelinahae* Magoai, **sp. nov.**, *Atherigona* (*Atherigona*) *angolaensis* Magoai, **sp. nov.**, and *Atherigona* (*Atherigona*) *cuanavaleensis* Magoai, **sp. nov.** A key to the males of *Atherigona* species is provided, along with brief generic diagnoses of the new species and illustrations of most Angolan species.

Key words: Afrotropical Region, identification key, new species, shoot flies, taxonomy

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Introduction

Shoot flies (*Atherigona* Rondani, 1856) are among the most speciose genera of Muscidae, with approximately 260 described species, of which about 172 occur in the Afrotropical region (Dike 2003; Couri et al. 2006; Muller 2015; Muller and Mostovski 2018; Deeming 2019, 2022; Deeming and Kirk-Spriggs 2024; Magoai and Muller 2024). They occur in all zoogeographical regions, except for the Antarctic region (Deeming and Kirk-Spriggs 2024). *Atherigona* species are known to be of economic significance worldwide, particularly due to their larval feeding behaviour leading to a reduction in agricultural yields (Young and Teetes 1977; Sherwill et al. 1999; Pont and Deeming 2001; Van den Berg et al. 2005; Muller and Mostovski 2018). The genus consists of two subgenera: *Atherigona sensu stricto* and *Atherigona* (*Acritochaeta*) Grimshaw, 1901 (Couri et al. 2006; Muller 2015; Deeming and Kirk-Spriggs 2024; Magoai and Muller 2024). *Atherigona s. str.* attacks cultivated crops, with larvae feeding mostly on Poaceae, which includes several cereal crops (Couri et al. 2006; Muller 2015;

Deeming and Kirk-Spriggs 2024; Magoai and Muller 2024). In contrast, the larvae of *Atherigona* (*Acritochaeta*) species are typically considered saprophages or facultative predators in decaying organic matter (Skidmore 1985; Grzywacz et al. 2013). Unlike most species of *Acritochaeta*, *Atherigona* (*Acritochaeta*) *orientalis* Schiner, 1868 is an agricultural pest of crops such as peppers, tomatoes, and sorghum (Savage 2016; Roditakis et al. 2023).

Regardless of their economic and agricultural significance, the diversity of shoot flies is still poorly understood, particularly in Angola. Angola's ecological landscape, ranging from rainforests to savannas and dunes, provides a suitable habitat for its flora and fauna (Huntley 2023). *Atherigona* species thrive in most temperate and tropical areas (Deeming 2022). However, biodiversity research in Angola has been limited for several years due to the civil war (1975–2002) (Huntley 2023). A growing interest in its biological collections has re-emerged in recent years, with some Muscidae species being recorded in Angola. Couri and Pont (2016) listed 33 species, of which 30% belong to the genus *Atherigona*; however, taxonomic studies from the country remain limited.

Atherigona species are not always easy to identify, typically requiring experience or taxonomic expertise. The vast majority of species can only be identified by using a special terminal structure called the trifoliate process in males, or the shape of tergite 8 in females, in combination with mostly external colour features (Deeming 1971; Muller 2015; Deeming 2022). Although some females have been described along with males, the vast majority of species are based only on males. Unless specimens are collected in copula or in large series from the same type locality, matching males and females is not a simple task. Morphological characters of unknown females alone cannot reliably be used to associate them with male species, as males and females are known to be sexually dimorphic (Deeming 1971; Muller 2015; Deeming 2022).

While no single key exists for all described *Atherigona* species, keys covering the Afrotropical fauna provide useful guidance for identifying most species in the region (Deeming 1971; Dike 1989; Muller 2015; Muller and Mostovski 2018; Deeming and Kirk-Spriggs 2024). This research contributes to the growing knowledge of *Atherigona* in Angola, working towards a thorough study of the diversity of the group within the region. It allows for contributions to the description of new species, the identification of existing species, or the redescription of already known species, thereby expanding the taxonomic knowledge. A key to the males of *Atherigona* species is provided, with descriptions of new species from Angola.

Material and methods

Collection abbreviations

AMGS Albany Museum, Makhanda, South Africa

Locality and collecting methods

The specimen series from which the novel species are here described were sampled by the third author, T. Bellingan, during the Lisima Expedition in 2022 and are housed in the Albany Museum, Makhanda, Eastern Cape,

South Africa. Specimens were collected either by hand using a sweep net or through Malaise trapping. Specimens were examined from three sites (Figs 1a–f, 2). The map of collecting sites was created using SimpleMappr (Shorthouse 2010). All flies were micro-pinned in the field during the expedition. Permits for collecting and exporting the material were issued by the Instituto Nacional da Biodiversidade e Áreas de Conservação (INBAC) – Declaração No. 08/PNY.INBAC.MINAMB/2024.

Figure 1. Study sites: **a–c.** Cuanavale source lake, 13°5'31.34"S, 18°53'38.53"E; **d, e.** Moxico, Lungwebungu Riverbank, 12°35'3.32"S, 18°40'4.87"E; **f.** Bié, Camacupa, 8 km ENE of Camacupa, 12°0'45.70"S, 17°32'59.17"E. Photos by T. Bellingan.

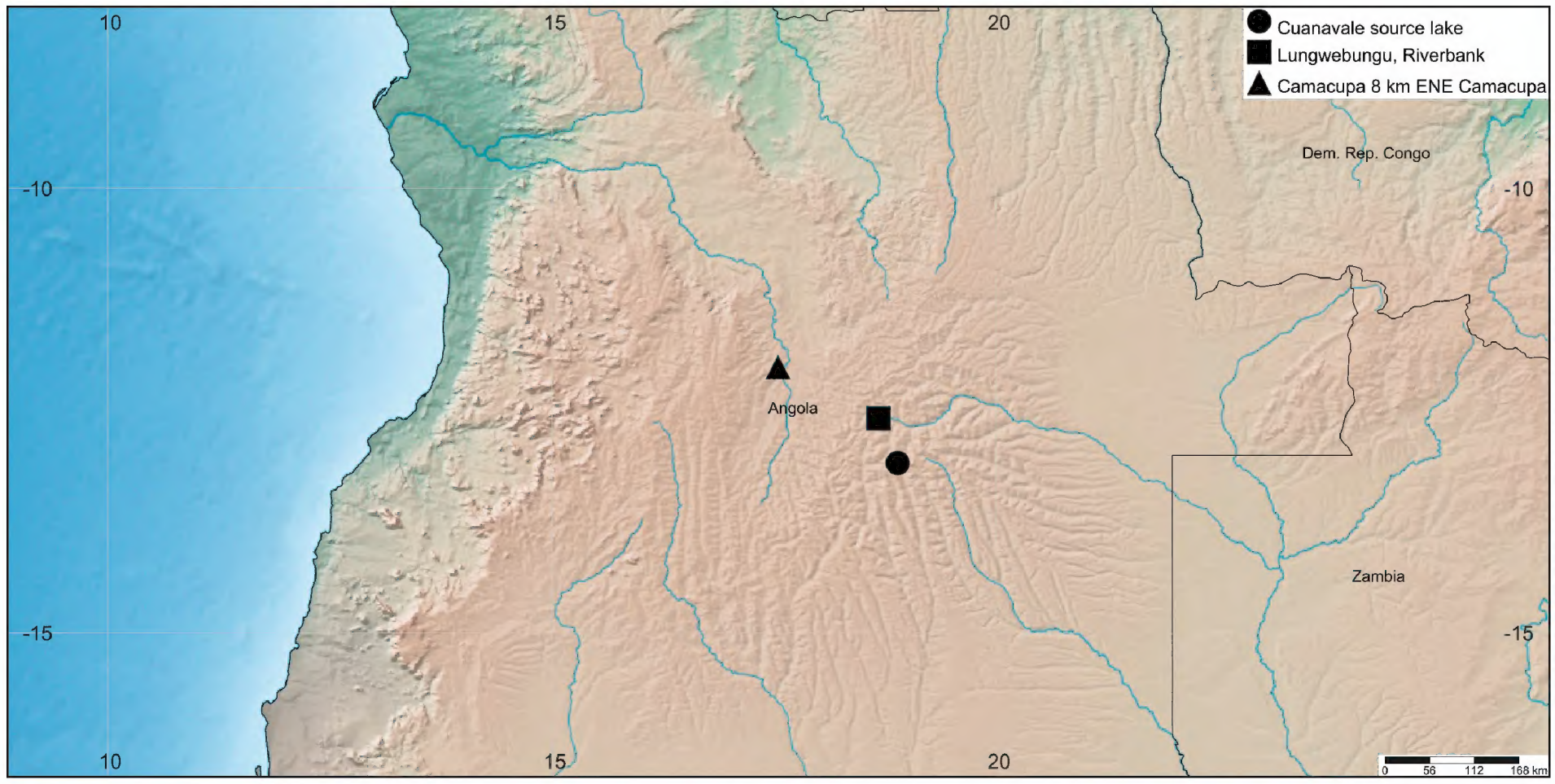


Figure 2. Map of collecting sites in Angola from the Lisima Expedition 2022. Created using SimpleMappr (Shorthouse 2010).

Specimen treatment

Some male terminalia were macerated in 10% heated potassium hydroxide (KOH) for approximately 10 minutes, and the trifoliate process was exposed. For other specimens, the trifoliate process was exposed using forceps after placing the specimens in relaxing containers to allow for manipulation without damage. Specimens were identified using a combination of keys provided by Deeming (1971) and Dike (1989), with corrections made by Deeming and Kirk-Spriggs (2024) and Muller (2015). All measurements of the four new species were made using a Nikon SMZ745T stereomicroscope with an attached Motic camera and Motic Images Plus 3 software. Habitus photographs were taken using a Canon 850D camera, while illustrations of terminalia were created using Adobe Illustrator.

Key to males of Angolan *Atherigona* species

1 Crossvein *r–m* usually at or beyond middle of cell *dm*; fore femur often with a shallow dorsal preapical excavation; cercal plate simple; trifoliate process and hypopygial prominence absent — Subgenus *Acritochaeta* ...**2**

– Crossvein *r–m* always well in basal half of cell *dm*; fore femur without a shallow dorsal preapical excavation; cercal plate developed into a trident-shaped organ, consisting of three apical lobes on a long stem, typically called a trifoliate process (some African species with a more complicated structure); hypopygial prominence usually present, rarely absent — Subgenus *Atherigona* **3**

2 Fore femur with dorsal preapical excavation; crossvein *r–m* positioned very distinctly distad to middle of cell *dm* .....***A. orientalis* Schiner**

– Fore femur without dorsal preapical excavation; crossvein *r–m* positioned at 0.42 of length of cell *dm* .....***A. cogani* Deeming**

3 Hypopygial prominence knob-shaped, with apex truncated, rounded, or emarginate; sometimes with anterior and/or posterior projections **4**
– Hypopygial prominence bifurcate or bilobate **8**
4 Hypopygial prominence in the shape of a rounded knob (Fig. 14d); frontal vitta infuscated with apical third yellow.....***A. laevigata*** **(Loew)**
– Hypopygial prominence and frontal vitta variable.....**5**
5 Frontal vitta yellow; hypopygial prominence oval in dorsal view and truncate posteriorly (Fig. 12c, d) .....***A. campestris*** **Deeming**
– Frontal vitta infuscated; hypopygial prominence apically dilated and truncated (Fig. 18c, d), or with anterior and/or posterior projections (Fig. 8d, e, 10d, e) **6**
6 Frontal plate silver-grey dusted; hypopygial prominence widely knob-shaped with a pair of very weakly developed posteriorly projecting processes (Fig. 10d, e); trifoliate process with stem and hood hyaline, median piece and lateral plates infuscate with hyaline bases, median piece moderately dilated at apex in posterior view, somewhat club-shaped with clear apical emargination and with short setulae apically, median piece without any dilation in profile; lateral plates wider than the median piece in posterior view and in profile (Fig. 10a, b) ....***A. angolaensis*** **Magoai, sp. nov.**
– Frontal plate with glossy appearance; hypopygial prominence and trifoliate process not as above.....**7**
7 Fore femur infuscated on apical half; hypopygial prominence apically dilated and truncated (Fig. 18c, d); trifoliate process entirely infuscate; median piece filiform in posterior view, bearing short pale setulae on ventral margin (Fig. 18a, b) ..... ***A. mirabilis mirabilis*** **Deeming**
– Fore femur infuscated on apical two-thirds; hypopygial prominence in the shape of a truncated knob with four processes, two projecting anteriorly and two posteriorly; trifoliate process hyaline except for median piece and lateral plates infuscated on apical halves and bottom two-thirds of stem; median piece linear with slight abrupt apical dilation in posterior view with infuscated setulae (Fig. 8a, b) .....***A. adelinahae*** **Magoai, sp. nov.**
8 Hypopygial prominence bifurcate **9**
– Hypopygial prominence bilobate.....**13**
9 Frontal vitta yellow, at most the borders somewhat infuscate posteriorly; median piece of trifoliate process linear in posterior view, hardly dilated apically (Fig. 19a) .....***A. ruficornis*** **Stein**
– Frontal vitta entirely infuscated, at most with dull lighter suffusion at apex; median piece of trifoliate process apically dilated in posterior view.....**10**
10 Palpus infuscate, at most with surface of truncation lighter than the rest **11**
– Palpus yellow with infuscated base.....**12**
11 Fore femur infuscated on apical third; hypopygial prominence bifurcated with short, pointed processes (Fig. 15d) ..... ***A. lineata lineata*** **(Adams)**
– Fore femur yellow; hypopygial prominence strongly and in some cases widely bifurcate (Fig. 16d) .....***A. lineata ugandae*** **van Emden**
12 Frontal vitta infuscated, with dull lighter ferruginous suffusion at apex; abdominal tergites 3 and 4 each with two small dark spots; hypopygial

prominence with a shallow bifurcation, the processes large and rounded apically (Fig. 13d); the lateral plates of the trifoliate process at most as wide as median piece in profile (Fig. 13b)..... ***A. cuanavaleensis*** **Magoai, sp. nov.**

– Frontal vitta entirely infuscated; abdominal tergite 3 with two large spots, ca. 2 × the size of those on tergite 4; tergite 4 with two small spots; hypopygial prominence strongly bifurcate in posterior view (Fig. 9d), each process apically widening with an emargination, dividing it into an anterior and posterior sub-process..... ***A. albistyla*** **Deeming**

13 Frontal plate dusted in appearance; wing entirely hyaline; trifoliate process with lateral lobe without inner tooth, lobes wider than median piece in posterior view (Fig. 11)..... ***A. bedfordi*** **van Emden**

– Frontal plate glossy in appearance; wing with brown smoky suffusions over humeral crossvein and Sc-R_1; trifoliate process with the lateral lobe with an inner tooth and median piece similar in width to lateral lobe in posterior view (Fig. 17a) ..... ***A. matilei*** **Deeming**

Taxonomy

Family Muscidae
Subfamily Atherigoninae
Genus *Atherigona* Rondani, 1856
Subgenus *Atherigona* Rondani, 1856

***Atherigona* (*Atherigona*) *adelinahae* Magoai, sp. nov.**
https://zoobank.org/45FE8D4A-5721-4E18-B209-4C306F450612
Figs 3–5, 8

Type material examined. *Holotype*: Angola • 1♂; Moxico, Tempué, Cuanavale source lake, 13°5'31.34"S, 18°53'38.53"E, 5–7 Nov. 2022, T.A. Bellingan leg., Malaise trap; AMGS-ENT 101816; (AMGS).

***Paratype*:** Same data as holotype: 1♀, AMGS-ENT 101817; (AMGS)

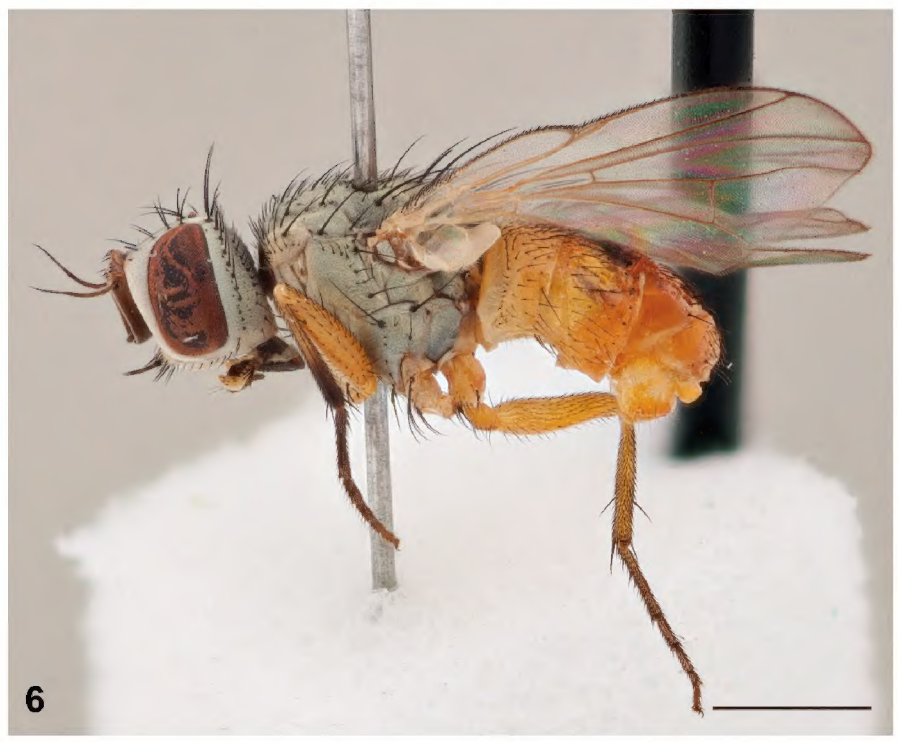
Type condition. Holotype ♂ is in a fair condition. Some setae and setulae missing from specimen, but the sockets/alveoli are clearly visible, allowing for description. Specimen was relaxed, and trifoliate process teased out of abdomen for examination and figuring.

Deposition information. Holotype is deposited in AMGS.

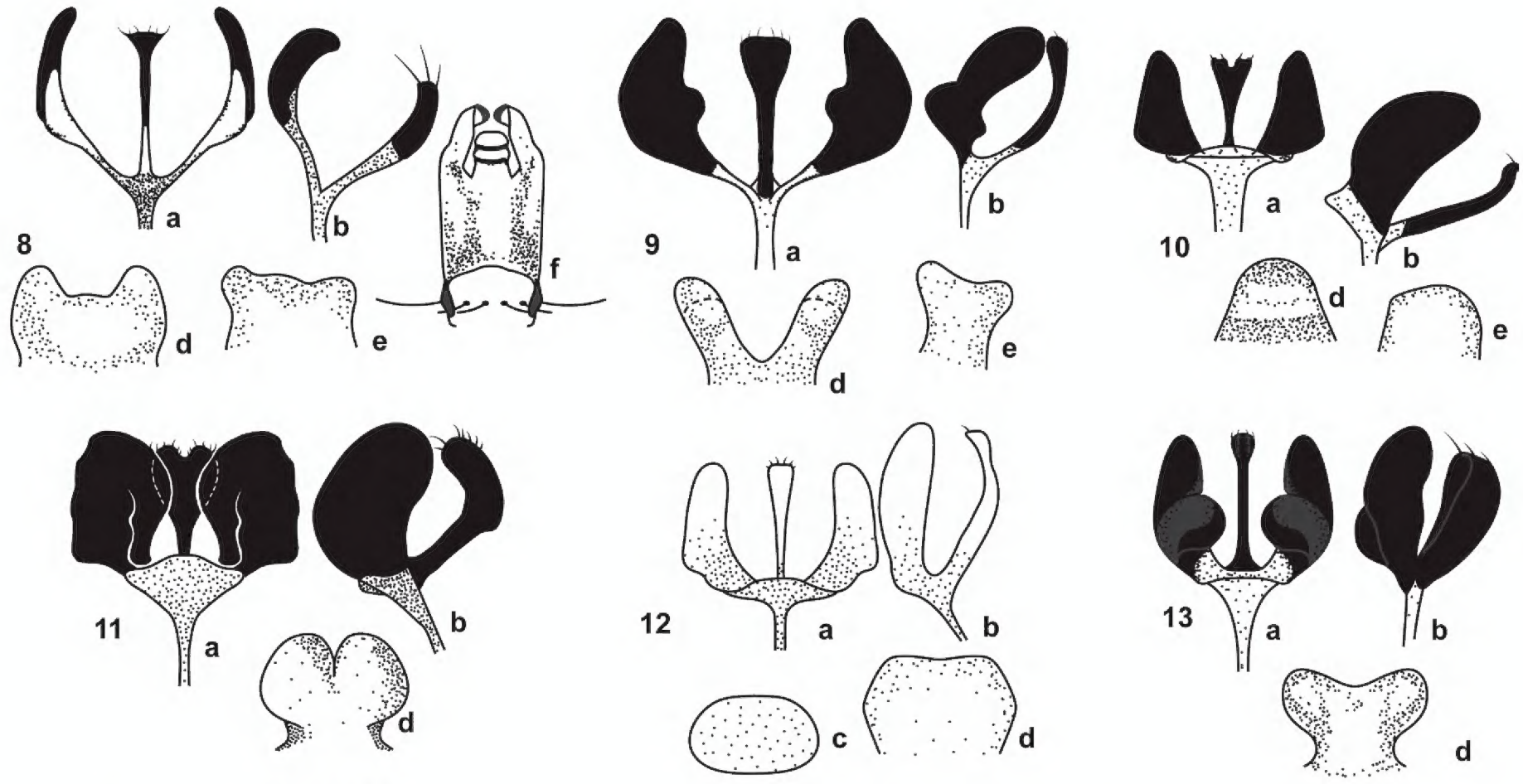
Diagnosis. *Atherigona adelinahae* Magoai, sp. nov.**,** has an overall dark appearance. The species is most similar to *Atherigona binubila* van Emden, 1940, in overall appearance, with infuscated frontal vitta and palpi, as well as wings with brown smoky suffusions at humeral crossvein and at Sc–R_1, but differs by having a glossy frontal plate and a hypopygial prominence shaped like a truncated knob with four processes, two projecting anteriorly and two posteriorly, in contrast to the two processes of *A. binubila*.

Description. Measurements: Holotype ♂: Body length: 3.74 mm, wing: 3.21 mm, *r*–*m* crossvein ratio: 0.40; female paratype: Body length: 4.21 mm, wing: 3.14 mm, *r*–*m* crossvein ratio: 0.41.

Male. *Head*: Ground colour dark brown; all head setae and setulae infuscated; Occiput glossy brownish-grey on upper half, lower occiput transitioning from silver-grey to golden-grey; posterior margin of eye silver-grey dusted; ocellar



Figures 3–7. *Atherigona* species: **3.** Lateral habitus *Atherigona adelinahae* sp. nov. holotype male; **4.** Lateral habitus *Atherigona adelinahae* sp. nov. paratype female; **5.** Posterodorsal view of *Atherigona adelinahae* sp. nov. paratype female abdomen; **6.** Lateral habitus of *Atherigona angolaensis* sp. nov. holotype male; **7.** Lateral habitus of *Atherigona cuanavaleensis* sp. nov. holotype male. Scale bars: 1 mm.



Figures 8–19. Trifoliate process and hypopygial prominence of **8.** *A. adelinahae* sp. nov.; **9.** *A. albistyla*; **10.** *A. angolaensis* sp. nov.; **11.** *A. bedfordi*; **12.** *A. campestris*; **13.** *A. cuanavaleensis* sp. nov.; **14.** *A. laevigata*; **15.** *A. lineata* ssp. *lineata*; **16.** *A. lineata ugandae*; **17.** *A. matilei*; **18.** *A. mirabilis* ssp. *mirabilis*; **19.** *A. ruficornis*. Trifoliate process: **a** posterior view **b** profile. Hypopygial prominence **c** dorsal view **d** posterior view **e** profile **f** female tergite 8. (**17, 19** adapted from Muller (2015), **11, 12, 15, 18** adapted from Muller and Mostovski (2018), **14**, **16** adapted from Magoai and Muller (2024)).

triangle dark grey dusted, sub-shining; frontal plate glossy with three pairs of proclinate frontal setae, one much weaker and shorter near frontal angle, also with two pairs of reclinate orbital setae; frontal vitta infuscated, appearing velvety black; parafacial silver-grey dusted except for area touching frontal plate, which is slightly glossy; parafacial at narrowest as wide as aristal base; scape, pedicel, and postpedicel infuscated; arista infuscated, slightly ferruginous near basal third; palpus infuscated, apically dilated, and truncated with hyaline

setulae; vibrissal angle with three vibrissal setae: one long and well-developed, and two much weaker and shorter, these surrounded by three weak setulae.

***Thorax*:** Ground colour dark brown; postpronotal lobe golden-yellow dusted laterally, dorsally more whitish-grey dusted, lobe with three setae: two strong, one weaker, and eight setulae; scutum mostly grey dusted, with three dark dorsocentral vittae, the middle vitta appearing to extend to the scutellum; scutellum dark on dorsal surface and grey dusted, margins more densely grey dusted; one pair of basal setae, one pair of discal setae, and five discal setulae; one pair of subbasal setae and one pair of apical setae, subbasal and apical pair subequal; proepisternum, proepimeron, anterior margins of anepisternum golden-yellow dusted, remaining pleura golden-grey dusted; proepimeron with inconspicuous, weak process, with two setae, one stronger than the other, and one setula; katepisternal setae 1:1:1.

***Legs*:** Coxae yellow, fore coxa lightly whitish dusted; legs mostly yellow except for apical two-thirds of fore femur and majority of tibia infuscated; fore tarsi and mid and hind basitarsi mostly infuscated, remaining tarsal segments appearing dirty yellow; without any specialized chaetotaxy.

***Wings*:** Hyaline except for dull brownish suffusion in costal cell near humeral crossvein and in cell *sc* before vein R_1 meets costal vein; veins light-brown; halter with light-yellow knob and dark-yellow stalk; calypters somewhat golden-yellow.

***Abdomen*:** All tergites and sternites yellow; tergite 1+2 with a median dorsal mark and brownish shadow near base; tergite 3 with two large elongated spots; tergite 4 with two small, elongated spots; tergite 5 immaculate.

***Terminalia*:** Hypopygial prominence in the shape of a truncated knob with four processes, two projecting anteriorly and two posteriorly. Trifoliate process hyaline except for median piece and lateral plates infuscated on apical halves and bottom two-thirds of stem; stem dilated and flattened on infuscated section; median piece linear with slight abrupt apical dilation in posterior view with short infuscated setulae; lateral plates narrow, only somewhat wider in profile than median piece, inner lobes absent. Surstylus without any infuscation.

Female. *Head*: Ground colour blackish-brown; frontal plate, ocellar triangle, and upper occiput glossy in combination with a narrow, infuscated frontal vitta; the lower occiput partly glossy, otherwise grey dusted; lower median part of occiput yellowish, undusted; parafacials grey dusted, appearing brownish-grey dusted depending on viewing angle, at narrowest as wide as base of arista; frontal plate with two pairs of strong proclinate frontal setae, one weaker (damaged in specimen), and two reclinate pairs of orbital setae; scape mostly ferruginous, infuscate dorsally; pedicel ferruginous; postpedicel infuscated except for ferruginous inner basal margin; arista mostly ferruginous, appearing somewhat infuscated on apical half; palpus entirely infuscated, appearing strap-like, with some short, infuscated setulae; vibrissal angle with three strong, infuscated vibrissal setae surrounded by three small setulae.

***Thorax*:** Ground colour yellow; postpronotal lobe yellow, lobe with three setae: two weak, one strong, and 10 short setulae; scutum dark brown, dorsocentral vittae not visible, with a dark median vitta, surroundings grey dusted; scutellum similarly dark brown with slight dusted appearance on margins; one pair of basal setae, one pair of discal setae and nine discal setulae, one pair of subbasal setae, and one pair of apical setae, subbasal and apical pair subequal; pleura yellow with some scattered whitish-grey dusting, especially on proepimeron, anterior margin of anepisternum, anepimeron, and katepisternum; proepimeron without conspicuous

process, with two setae, one stronger than the other, and one setula; katepisternal setae 1:1:1 and with a row of small setulae below anterior katepisternal setae.

***Legs*:** Coxae yellow, with slight whitish-grey dusted appearance anteriorly; fore leg with apical third of femur and entire tibia infuscated; midleg with femur and tibia yellow, the tarsi dirty yellow; hind leg with femur yellow, tibia infuscated except for basal quarter, and tarsi similarly dirty yellow as mid tarsi; midleg tarsi infuscated; without any specialized chaetotaxy.

***Wings*:** Hyaline except for dull brownish suffusion near cell *sc* before vein R_1 meets costal vein; veins light-brown; halter with yellow knob and yellow stalk; calypters somewhat yellowish-brown.

***Abdomen*:** All tergites and sternites yellow and without dorsal median vittae; tergite 1+2 immaculate; tergites 3 and 4 with a brownish shadow in-between tergites; tergite 5 with a single median dark spot (Fig. 5).

***Terminalia*:** Tergite 8 (Fig. 8f) brown, with three lobes; median lobe with base light brown, apically dark brown and rounded; lateral lobes with sclerites not separated, medially light brown with base and sclerites dark brown.

Etymology. Named in honor of Adelinah Magoai, the mother of the first author, for her love and support. Noun in the genitive case.

Distribution. Angola.

Atherigona (*Atherigona*) *albistyla* Deeming, 1971

Fig. 9

Atherigona albistyla Deeming, 1971: 164, figs 81, 82; Deeming 1979: 40, figs 23–25; Deeming and Overman 1987: 117; Dike 2003: 219 (distribution); Muller and Mostovski 2018: 346, fig. 32; Deeming and Kirk-Spriggs 2024: 505.

Material examined. Angola • 1♂; Bié, Camacupa 8 km ENE Camacupa, 12°0'45.70"S, 17°32'59.17"E, 03 Nov. 2022, T.A. Bellingan leg., by hand; AMGS-ENT 101806.

Remarks. Both Deeming (1971: 141) and Dike (1989: 557) have key couplets, 49' and 53' respectively, dealing with *A. albistyla* that have similar couplets stating erroneously that "at least fore tibia largely infuscate," whereas the tibia of *A. albistyla* is only somewhat infuscated on the apical third. Additionally, Muller and Mostovski (2018: 345) mistakenly refer to the trifoliate process in couplets 21 and 21' as "Trifoliate process bilobate, never with a distinct bifurcation" and "Trifoliate process with either a deep or shallow bifurcation," respectively, but actually refer to the hypopygial prominence. These corrections are provided to allow future users to more easily use those keys. Deeming (1971: fig. 82) and Muller and Mostovski (2018: fig. 32) only figure the posterior view of the hypopygial prominence of *A. albistyla*. We now also include the lateral view of the hypopygial prominence, as it is quite distinctive in that each process apically widens with anterior and posterior sub-processes not mentioned in the original description. It should also be noted that the trifoliate processes figured by Deeming (1971: fig. 81), Dike (1989: fig. 77), and Muller and Mostovski (2018: fig. 32) end more pointed apically compared to the Angolan specimen that has the apex more rounded.

Distribution. Angola (new record), Burkina Faso, Kenya, Mali, Namibia, Nigeria, and Uganda.

***Atherigona* (*Atherigona*) *angolaensis* Magoai, sp. nov.**
https://zoobank.org/46F7EF2B-BEF9-4F1B-817D-BBC2ABC62679
Figs 6, 10

Type material examined. *Holotype*: ANGOLA • 1♂; Moxico, Lungwebungu, Riverbank, 12°35'3.32"S, 18°40'4.87"E, 9–11 Nov. 2022, T.A. Bellingan leg., Malaise trap; AMGS-ENT 101808.

Type condition. The holotype is in poor condition, with all legs except for left foreleg, right middle leg, and right hind leg missing. The trifoliate process and right middle leg are stored in a genital vial underneath the specimen.

Deposition information. Holotype is deposited in AMGS.

Diagnosis. *Atherigona angolaensis* Magoai, sp. nov. has an overall brown appearance. The species is most similar to *Atherigona ochripes* Deeming, 1981, in overall appearance, with yellow fore femur and predominantly yellow palpi, sometimes with infuscated base, as well as infuscated frontal vitta. However, it differs by having a widely knob-shaped hypopygial prominence with a pair of very weakly developed posteriorly projecting processes compared to these being truncated and emarginated in *A. ochripes*.

Description. Measurements (Holotype): Body length: 3.95 mm, wing: 3.14 mm, *r–m* crossvein ratio: 0.43.

Male. *Head*: Ground colour brown; all head setae and setulae infuscated; frontal plate, ocellar triangle, and upper occiput silver-grey dusted; upper occiput with narrow median part glossy; lower occiput golden-grey dusted near bottom edge surrounding mouthparts; frontal plate with three pairs of proclinate frontal setae: one weak near frontal angle and two stronger, also with two pairs of reclinate orbital setae; frontal vitta infuscated; parafacial silver-grey except for small area near frontal angle and where it meets frontal plate, which is golden-grey dusted; parafacial at narrowest wider than aristal base; scape and pedicel mostly ferruginous, pedicel with some infuscation dorsally; postpedicel infuscated for the most part except for narrow ferruginous basal margin; arista dark brown; palpus yellow with infuscated base; palpal base with infuscate setae: four strong and two weaker; vibrissal angle with four well-developed vibrissal setae surrounded by seven setulae.

***Thorax*:** Ground colour brown; postpronotal lobe golden-grey dusted, lobe with three setae: one strong and two weak, and 16 setulae; scutum silver-grey dusted with some gold-grey dusted areas throughout, with three faint dorsocentral vittae not extending to the scutellum; scutellum silver-grey dusted dorsally with apical margins golden-grey dusted; one pair of basal setae, one pair of discal setae and 13 discal setulae, one pair of subbasal setae and one pair of apical setae, subbasal and apical pair subequal; pleura golden-grey dusted; proepimeron without conspicuous process, with two setae, one stronger than the other, and one setula; katepisternal setae 1:1:1 and with a row of small setulae running down below anterior seta towards ventral margin of katepisternum; bottom katepisternal seta situated closer to posterior seta than anterior seta.

***Legs*:** Coxae yellow, with fore coxa lightly whitish dusted; all legs yellow except apical half of fore tibia lightly infuscated as well as majority of fore tarsi; without any specialized chaetotaxy.

***Wings*:** Hyaline; veins light-brown; halter with white knob and yellow stalk; calypters somewhat light-brown.

***Abdomen*:** All tergites and sternites yellow and without dorsal median vittae; tergite 1+2 immaculate; tergite 3 with two large spots; tergite 4 with two small spots, lightly whitish dusted on dorsal surface; tergite 5 immaculate.

***Terminalia*:** Hypopygial prominence widely knob-shaped with a pair of very weakly developed posteriorly projecting processes. Trifoliate process with stem and hood hyaline, median piece and lateral plates infuscated with hyaline bases. Median piece in posterior view moderately dilated at apex, somewhat club-shaped with clear apical emargination and with short setulae apically; median piece without any dilation in profile; lateral plates wider than the median piece in posterior view and in profile; inner lobes not present. Surstylus not infuscated.

Female. Unknown.

Etymology. Named after the type locality country, Angola. Feminine adjective in the nominative singular case.

Distribution. Angola.

Atherigona (*Atherigona*) *bedfordi* van Emden, 1940

Fig. 11

Atherigona bedfordi van Emden, 1940: 120, figs 27, 55; Pont 1991: 339; Deeming 2000: 284; Dike 2003: 219 (distribution); Muller 2015: 860, fig. 42; Deeming and Kirk-Spriggs 2024: 506. *Atherigona humeralis* Wiedemann, 1830: 441, sensu Hennig 1964: 497 et auctt., non Skidmore 1985: 313, nec Pont (1986: 113).

Distribution. *Afrotropical Region*: Angola, Chad, The Gambia, Kenya, Madagascar, Mali, Namibia, Nigeria, Oman, Senegal, Seychelles, South Africa, and Sudan. *Palaearctic Region*: Egypt, Palestine, and Saudi Arabia.

Atherigona (*Atherigona*) *campestris* Deeming, 1971

Fig. 12

Atherigona campestris Deeming, 1971: 181, figs 155, 156; 1981: 111; Muller and Mostovski 2018: 353, fig. 4.

Distribution. Angola, Burkina Faso, Mali, Nigeria, and Uganda.

Atherigona (*Atherigona*) *cuanavaleensis* Magoai, sp. nov.

https://zoobank.org/35211378-1C77-4944-8FC7-5122ECD8A779

Figs 7, 13

Type material examined. *Holotype*: Angola • 1♂; Moxico, Tempué, Cuanavale source lake, 13°5'31.34"S, 18°53'38.53"E, 5–7 Nov. 2022, T.A. Bellingan leg., Malaise trap; AMGS-ENT 101815 (AMGS).

Type condition. Type specimen is in good condition. Specimen was relaxed, and trifoliate process teased out of abdomen for examination and figuring.

Deposition information. Holotype is deposited in AMGS.

Diagnosis. *Atherigona cuanavaleensis* Magoai, sp. nov.**,** has an overall dark appearance. The species is most similar to *Atherigona tigris*, Muller 2015, in overall appearance, with ferruginous scape and pedicel, as well as infuscated postpedicel except for basal margins, which are ferruginous. A shallow bifurcated hypopygial prominence, a trifoliate process with median piece linear with slight abrupt apical dilation in posterior view, strongly dilated in profile, and lateral plates with inner lobes. It differs from it by not having wings with slight brown smoky suffusion at apex of *Sc*-R_1. However, *A. tigris* has lateral plates appearing wider than median piece in profile compared to that of *A. cuanavaleensis*, which has lateral plates appearing as wide as median piece in profile.

Description. Measurements (Holotype): Body length: 3.6 mm, wing: 2.65 mm, *r*–*m* crossvein ratio: 0.38.

Male. *Head*: Ground colour dark; all head setae and setulae infuscated; upper occiput silver-grey dusted posteriorly with narrow median part glossy, laterally also silver-grey dusted, however, lower occiput golden-grey dusted; ocellar triangle grey dusted; frontal plate silver-grey dusted with three pairs of proclinate frontal setae, one much weaker and shorter near frontal angle, also with two pairs of reclinate orbital setae; frontal vitta infuscated, with dull lighter ferruginous suffusion at apex; parafacial golden-grey dusted, at narrowest as wide as aristal base; scape and pedicel ferruginous; postpedicel mostly infuscated except inner basal third ferruginous; arista medially ferruginous with base and apex infuscated; palpus yellow with base somewhat infuscated, with four strong, infuscated setulae at base and some hyaline setulae at apex; vibrissal angle with one long and strong and two shorter vibrissal setae, surrounded by three weak setulae.

***Thorax*:** Ground colour dark; postpronotal lobe golden-grey dusted in profile, appearing whitish grey dusted when viewed dorsally, postpronotal lobe with three setae: two strong, one weaker, and 11 setulae; scutum silver-grey dusted, with three faintly light brown dorsocentral vittae, not extending to the scutellum; scutellum silver-grey dusted dorsally and margins golden-grey dusted; one pair of basal setae, one pair of discal setae and two discal setulae, one pair of subbasal setae and one pair of apical setae, subbasal and apical pair subequal; proepisternum, proepimeron, anterior margins of anepisternum and katepisternum golden-grey dusted, remaining pleura silver-grey dusted; proepimeron with inconspicuous weak process, with two setae, one stronger than the other, and one setula; katepisternal setae 1:1:1 and with a row of three small setulae below anterior katepisternal seta. Anterior spiracle surroundings golden-grey dusted, posterior spiracle surroundings silver-grey dusted.

***Legs*:** Coxae yellow, slightly whitish dusted; all legs yellow except for foreleg with apical half of tibia and basitarsus with lightly infuscated appearance depending on viewing angle; no specialized chaetotaxy.

***Wings*:** Hyaline; veins light-brown; halter with white knob and yellow stalk; calypters somewhat hyaline with light-brown margins.

***Abdomen*:** All tergites and sternites yellow and without dorsal median vittae; tergite 1–4 with slight greyish dusted appearance on posterior margins, tergites 3 and 4 lightly grey dusted on dorsal surface; tergite 1+2 immaculate; tergites 3 and 4 each with two small dark spots; tergite 5 immaculate.

***Terminalia*:** Hypopygial prominence with a shallow bifurcation, the processes large and rounded apically. Trifoliate process infuscated except for bases of

median piece and lateral plates, entire hood, and apical third of stem, which are hyaline; median piece linear in posterior view with slight but abrupt apical dilation, basal third and two-thirds of margin yellow in profile and strongly dilated; lateral plate with inner lobe, appearing as wide as median piece in profile; inner lobe rounded and visible in profile; surstylus without any infuscation.

Female. Unknown.

Etymology. Named after the Cuanavale River source lake in Angola. Feminine adjective in the nominative singular case.

Distribution. Angola.

***Atherigona* (*Atherigona*) *laevigata* (Loew, 1852)**
Fig. 14

Coenosia laevigata Loew, 1852: 660 [1862: 28].
Atherigona laevigata: van Emden 1940: 113, figs 6, 56; Deeming 1971: 148, figs 13–18; Clearwater 1981: 308, figs 9, 10; Deeming 1987: 18; Deeming and Overman 1987: 117; Pont 1991: 341; Dike 2003: 220 (distribution); Muller 2015: 877, fig. 7; Muller and Mostovski 2018: 350, fig. 6; Deeming 2019: 91; Deeming 2022: 127; Magoai and Muller 2024: 54, fig. 8; Deeming and Kirk-Spriggs 2024: 513.
Atherigona scutellaris Stein, in Becker 1903: 110.
Atherigona minuta Schnabl & Dziedzicki, 1911: 183.

Distribution. *Afrotropical Region*: Angola, Comoros, Democratic Republic of Congo, Ethiopia, Kenya, Lesotho, Madagascar, Mali, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Seychelles, South Africa, Tanzania, Uganda, United Arab Emirates, Yemen, Zambia, and Zimbabwe. *Palaearctic Region*: Cyprus, Egypt, Israel, Jordan, Palestine, and Saudi Arabia.

***Atherigona* (*Atherigona*) *lineata* ssp. *lineata* (Adams, 1905)**
Fig. 15

Coenosia lineata Adams, 1905: 208.
Atherigona lineata: van Emden 1940: 137, figs 16, 36; Deeming 1971: 178, figs 139–148; Deeming and Overman 1987: 118; Deeming 1979: 46, figs 38–41; Pont 1991: 341; Dike 2003: 220 (distribution); Deeming 2008: 718; Muller 2015: 880, fig. 51; Muller and Mostovski 2018: 350, fig. 30; Deeming 2019: 91; Deeming and Kirk-Spriggs 2024: 514.
Atherigona nigripalpis Stein, 1913: 539; van Emden 1940: 103.

Material examined. Angola • 1♂; Moxico, Lungwebungu, Riverbank, 12°35'3.46"S, 18°40'3.32"E, 09–11 Nov. 2022, T.A. Bellingan leg., Malaise trap; AMGS-ENT 101807.

Distribution. *Afrotropical Region*: Angola, Botswana, Burkina Faso, Cameroon, Chad, Democratic Republic of Congo, Gambia, Kenya, Madagascar, Malawi, Mali, Mozambique, Namibia, Nigeria, Oman, Seychelles, South Africa, Tanzania, Uganda, United Arab Emirates, and Zimbabwe. *Palaearctic Region*: Jordan.

***Atherigona* (*Atherigona*) *lineata* ssp. *ugandae* van Emden, 1940**
Fig. 16

Atherigona lineata ssp. *ugandae* van Emden, 1940: 137, figs 18, 39. Deeming 1971: 177, figs 134–138; Deeming and Overman 1987: 118; Deeming 2000: 285; Muller 2015: 882, fig. 53; Magoai and Muller 2024: 55, fig. 9; Deeming and Kirk-Spriggs 2024: 515.

Material examined. ANGOLA • 2♂4♀; Moxico, Tempué, Cuanavale source lake, 13°5'31.34"S, 18°53'38.53"E, 05–07 Nov. 2022, T.A. Bellingan leg., Malaise trap; (2♂: AMGS-ENT 101804, AMGS-ENT 101805; 4♀: AMGS-ENT 101811, AMGS-ENT 101812, AMGS-ENT 101813, AMGS-ENT 101814; (AMGS) • 1♂2♀; Bié, Camcupa 8 km ENE Camcupa, 12°0'45.70"S, 17°32'59.17"E, 03 Nov. 2022, T.A. Bellingan leg., Malaise trap; (1♂: AMGS-ENT 101803; 2♀: AMGS-ENT 101809, AMGS-ENT 101810).

Distribution. Angola, Botswana, Chad, Ethiopia, Kenya, Lesotho, Malawi, Mali, Namibia, Nigeria, Rwanda, South Africa, and Uganda.

***Atherigona* (*Atherigona*) *matilei* Deeming, 1977**
Fig. 17

Atherigona matilei Deeming, [1977]: 148, figs 8–12; Deeming 1987: 20; Deeming and Overman 1987: 118; Dike 2003: 220 (distribution); Muller 2015: 885, fig. 64; Deeming 2019: 91; Deeming and Kirk-Spriggs 2024: 518.

Distribution. Angola, Botswana, Cameroon, Kenya, Madagascar, Mauritius, Namibia, Nigeria, South Africa, and Uganda.

***Atherigona* (*Atherigona*) *mirabilis* ssp. *mirabilis* Deeming, 1971**
Fig. 18

Atherigona mirabilis Deeming, 1971: 152, figs 26–28; Deeming 1979: 36, fig. 10; Dike 2003: 220 (distribution); Muller and Mostovski 2018: 352, fig. 13; Deeming and Kirk-Spriggs 2024: 518.

Distribution. Angola, Burkina Faso, Cameroon, Central African Republic, Ghana, Kenya, Mali, Namibia, Nigeria, and Uganda.

***Atherigona* (*Atherigona*) *ruficornis* Stein, 1913**
Fig. 19

Atherigona ruficornis Stein, 1913: 532; van Emden 1940: 121, figs 20, 50; Muller 2015: 897, fig. 38.

Distribution. Angola, Ethiopia, Kenya, Nigeria, South Africa, Tanzania, Uganda, Yemen, Zanzibar, Zimbabwe.

Subgenus *Atherigona* (*Acritochaeta*) Grimshaw, 1901

Atherigona (*Acritochaeta*) *cogani* Deeming, 1981

Atherigona cogani Deeming, 1981: 99, figs 1, 2.

Distribution. Angola.

Atherigona (*Acritochaeta*) *orientalis* Schiner, 1868

Atherigona orientalis Schiner, 1868: 295; Deeming 1971: 146, fig. 7; Deeming 1978: 367; Clearwater 1981: 308, fig. 11; Deeming and Overman 1987: 117; Pont 1991: 342; Dike 2003: 18 (distribution); Couri et al. 2006: 810; Deeming 2008: 718; Deeming 2019: 93; Deeming 2022: 140; Deeming and Kirk-Spriggs 2024: 528.
Coenosia excisa Thomson, [1869]: 560.
Atherigona trilineata Stein, 1900: 157.
Acritochaeta pulvinata Grimshaw, 1901: 42.
Atherigona magnipalpis Stein, 1906: 66.

Distribution. Angola, Benin, Burkina Faso, Cabo Verde, Cameroon, Central African Republic, Comoros, Côte d'Ivoire, Democratic Republic of Congo, Ghana, Kenya, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Nigeria, Oman, Réunion Is., Rodrigues Is., Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, United Arab Emirates, Yemen, Zambia, Zanzibar Is., and Zimbabwe.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

M.M.J. Magoai confirms ethical clearance, number NMB ECC 2025/01, forming part of project 573 of the National Museum, Bloemfontein, South Africa.

Use of AI

No use of AI was reported.

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Author contributions

M.M.J. Magoai conceptualised the project with inputs from B.S. Muller. Magoai identified, described and revised the species, and wrote the first draft of the manuscript. Muller photographed and Magoai illustrated specimens. Bellingan and Muller commented and made additions to the final draft.

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Data availability

All of the data that support the findings of this study are available in the main text.

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